Previous assignment (4.5 part 1)

19. CHECK ANSWER: $t = \dfrac{\ln \frac{10}{3}}{12 \ln 1.025}$

book answer $\rightarrow$ $t = \dfrac{\ln \frac{10}{3}}{12 \ln \frac{41}{40}}$

←They converted the decimal to a fraction. (Not necessary.)

Previous assignment (4.5 part 1)

25. CHECK ANSWER: $x = \dfrac{-14}{\log 3}$

book answer $\rightarrow$ $t = \dfrac{14 \log 0.1}{\log 3}$

←log0.1 can be simplified further. (which will be required on the unit test)

Yesterday's assignment:

Show work! Clearly show all steps.

31. $4^x + 2^{1+2x} = 50$

$2^{2x} + 2^{1+2x} = 50$

$2^{2x}(1 + 2^1) = 50$

$2^{2x}(3) = 50$

$\log 2^{2x} = \log \frac{50}{3}$

$2x \log 2 = \log \frac{50}{3}$

$2x = \frac{\log \frac{50}{3}}{\log 2}$

$x = \frac{\log \frac{50}{3}}{2 \log 2} \approx 2.029447$

- Isolate exponential term
- Apply ln or log to both sides of the equation
- "bring down" the exponent
- Solve for x

Notes: 4.5 (part 2)

Reminder:

log0 = no solution ← or undefined $(\text{because } 10^x = 0)$

log(neg #) = no solution $10^x = neg\,\#$

ln0 = no solution $e^x = 0$

ln(neg #) = no solution $e^x = neg\,\#$

Notes: 4.5 (part 2)

Techniques for solving equations:

- **Use equal bases on both sides.**
- **Apply laws of logarithms.**
- **Factor quadratic equations using the FOIL method.**
- **Factor the GCF (greatest common factor).**
- **Apply Zero Product Property.**

Notes 4.5: Example

Solve for x: $xe^{2x} + 2xe^{x} = 15x$

- Set equal to 0
- Factor GCF
- Factor using FOIL
- Solve using Zero Product Property
- Check for extraneous answers (no solution)

$$Xe^{2x} + 2xe^{x} - 15x = 0$$

$$X(e^{2x} + 2e^{x} - 15) = 0$$

$$X(e^{x} - 3)(e^{x} + 5) = 0$$

$X = 0$

$e^{x} - 3 = 0$

$e^{x} = 3$

$\ln_e 3 = x$

$X = \ln 3$

$e^{x} + 5 = 0$

$e^{x} = -5$

$\ln_e(-5) = x$

no solution

4.5 (part 2) CHECK EVEN ANSWERS:

40. $x = \ln 3$

46. $x = -1,\ x = -2$

48. $x = \dfrac{-1 \pm \sqrt{5}}{2}$

57. $x = \dfrac{1}{100}$ ← preferred form

book answer: $x = 0.01$